Pacific-Basin Finance Journal 62 (2020) 101292

Contents lists available at ScienceDirect

Pacific-Basin Finance Journal

journal homepage: www.elsevier.com/locate/pacfin

The effects of interest rate on Islamic bank financing instruments: Cross-country evidence from dual-banking systems

Mirzet Šeho[a,*], Obiyathulla Ismath Bacha[b], Edib Smolo[c]

[a] School of Business, Monash University Malaysia, Jalan Lagoon Selatan, Bandar Sunway 47500, Selangor Darul Ehsan, Malaysia
[b] School of Graduate Studies, International Centre for Education in Islamic Finance (INCEIF), Lorong Universiti A, Petaling Jaya 59100, Kuala Lumpur, Malaysia
[c] Department of Economics and Management, International University of Sarajevo, Hrasnička cesta 15, Ilidža 71210, Bosnia and Herzegovina

ARTICLE INFO

Keywords:
Islamic banks
Financing
Instruments
Interest rate
Risk-sharing

ABSTRACT

In theory, the cornerstones of Islamic finance are interest avoidance and risk-sharing. In practice, however, Islamic banks seem to be lacking both, particularly the latter. We investigate the interest rate impact on Islamic banks' three most-widely used types of financing instruments – i.e. sale-based, lease-based and risk-sharing – by employing the system GMM estimators on a unique panel data set of 77 Islamic banks from 13 countries over the period 2003–2017. We find that sale- and lease-based financing instruments are negatively correlated with the interest rate and that their exposure is amplified in more developed Islamic banking jurisdictions. Risk-sharing instruments, however, appear to be out of the interest rate domain of influence except in less developed Islamic banking jurisdictions, where the impact is positive. Additionally, the above effects on sale-based and risk-sharing instruments hold true only in the case of full-fledged Islamic banks and Islamic bank subsidiaries, respectively; the impact on lease-based instruments hold under all specifications. The findings imply that predominant use of sale- and lease-based financing instruments in their current form undermines the interest-free and risk-sharing essence of Islamic banking and runs the risk of converging with its conventional counterpart.

1. Introduction

For most Islamic finance academicians, interest rate should not have any bearing on Islamic finance. After all, Islam strictly prohibits *riba* (usury or interest): "…*but Allah has permitted trade and forbidden usury*" (Qur'an 2:275).[1] Based on this verse and the legal maxims "*loss commensurates with gain*"[2] and "*earning commensurates with liability*",[3] it has been argued that the organizing principle of Islamic finance is conditioned by risk-sharing and the prohibition of *riba* (Askari, 2012; Iqbal and Mirakhor, 2013; ISRA and Durham University, 2012; Mirakhor, 2010; Alaabed and Masih, 2016). So, why would anyone even think of investigating the interest rate effects on Islamic bank financing instruments? The reason is, there appears to be plenty of evidence which suggests that Islamic banks have deviated from their initially envisaged models, that they have mimicked conventional banking and have been using many of its techniques and instruments (Alaabed et al., 2015). As a consequence, they have become susceptible to the very problems they are supposed to provide an alternative for.

* Corresponding author.
E-mail addresses: mirzet.seho@monash.edu (M. Šeho), obiya@inceif.org (O.I. Bacha).

[1] Translation by Ali (2006).
[2] *"Al-ghurmu bi al-ghunmi."* see Mejelle (2007).
[3] *"Al-kharaju bi al-dhaman."* see Mejelle (2007).

https://doi.org/10.1016/j.pacfin.2020.101292
Received 3 December 2019; Received in revised form 3 February 2020; Accepted 14 February 2020
Available online 19 February 2020

Modern Islamic finance emerged as a result of conventional finance failures to meet the demand for financial products and instruments in compliance with *Shari'ah* requirements – i.e. free from interest. Scholarly writings on the theory of Islamic finance since the 1970s have been calling for an Islamic finance system based on risk-sharing and free from interest rate-based debt contracts (Iqbal and Mirakhor, 2013, p. 25). In relation to the prevailing conventional finance, this meant a paradigm shift. However, Islamic finance practitioners, the greater part of whom had been practicing conventional finance, seem to have ignored these calls. Instead, they created products and instruments that avoid the appearance of interest-based debt, and at the same time are familiar to and accepted by conventional market players. In order to fulfil the requirement of *riba* avoidance, conventional finance products and instruments became subject to replicating, retrofitting and financial engineering. Whereas the scholars called for risk-sharing finance, the practitioners focused on creating short-term trade and debt-based finance (Aggarwal and Yousef, 2000; Ariff, 1988; Mirakhor, 1987; Mirakhor and Smolo, 2012, 2014). While expecting an alternative, we seem to have gotten Islamic finance that seems to be functionally indistinguishable from its conventional counterpart.

This divergence of practice from the theory, as manifested by Islamic banks' preference for short-term trade or debt-based over risk-sharing finance, may not come as a surprise. Risk-sharing finance is relatively risky and requires expertise which is not easily available and comes with a cost (Ariff, 1988; Chapra and Khan, 2000). Risk-sharing finance is also more susceptible to moral hazard and adverse selection problems than traditional debt-based finance (Azmat et al., 2015). Additionally, the lack of risk-sharing financing by Islamic banks can be attributed to low demand from borrowers which, in the presence of asymmetric information and Islamic banks funded mainly by risk-averse depositors, can better maximize their profits through debt than through equity instruments (Azmat et al., 2015). On the other hand, short-term financing is less risky, simpler to administer, and it provides faster returns (Ariff, 1988). Debt contracts are less prone to asymmetric information (Ueda, 2004) and are less costly to monitor than equity contracts (Gale and Hellwig, 1985; Townsend, 1979). In fact, the contracting environments are designed in such a way that they favor debt-based over equity-based financing, which makes this preference of Islamic banks a completely rational choice (Aggarwal and Yousef, 2000; Chapra and Khan, 2000; Khan, 2010).[4]

The inclination towards short-term and debt-based financing might have been sensible in the early stages of development as Islamic banks were trying to take root. However, the imitation now seems to have continued too far and for too long (Bacha, 2019). Attempts have been made to justify this inclination towards debt-based financing at the early phase on the grounds of customers' familiarity with conventional banking and its fixed-cost products and the need for the infant industry to gain commercial significance. However, the things appear to be not much different in this regard even after more than five decades since the introduction of the first modern Islamic bank.[5] What started in the beginning as imitation of products, went further into replicating the processes and systems, and in the end, even the regulation (Bacha, 2019). The trajectory, expectedly, has not been without cost. As a consequence, Islamic banks in dual banking systems have become exposed to similar problems as their conventional counterparts. These include, amongst other things, interest rate risk.

The existing literature implies that Islamic banks are struggling, if not failing, to meet the two necessary conditions that would render them Islamic. Only a negligible fraction of Islamic banks' financing in Malaysia, one of the most active dual-banking jurisdictions, is based on the risk-sharing principle, while the risk-sharing deposits are not interest-free (Chong and Liu, 2009). In fact, our data reveal that risk-sharing financing of Islamic banks comprised on average less than 5% over the period 2003–2017 and about 5.4% as of 2017.[6] Instead of risk-sharing, Islamic banks are found to practice mostly risk-shifting, just like their conventional counterparts (Alaabed et al., 2015). It has also been shown that the overall Islamic banks' business model with regard to business orientation, efficiency, stability, and risk-taking does not differ much from that of conventional banks (Beck et al., 2013). Khan (2010) goes even further and contends that Islamic banking, as currently practiced, is functionally indistinguishable from conventional banking and does not provide an alternative to the same. However, he asserts, it does bolster a recognizably different Islamic identity by using the suitable Arabic vocabulary for what in essence is conventional financial transactions.

Indeed, a number of studies document Islamic banks' exposure to interest rate risk. For example, in Malaysia, Ibrahim and Sukmana (2011), Adebola et al. (2011), Ibrahim and Sufian (2014), Ahmad and Abdul Majid (2017) and Zulkhibri (2018) find that interest rates negatively affect Islamic bank financing. Contrary to these findings, Kader and Leong (2009) show that a conventional base lending rate has a positive impact on *Bai' Bithaman 'Ajil* (BBA) property financing of Islamic banks in Malaysia, while Ibrahim (2016) find the impact of money market rate on Malaysian Islamic bank financing to be insignificant. Conflicting effects of interest rates on Islamic bank financing are also found in Turkey. For instance, while Ergeç and Arslan (2013) find the effects to be positive, Aysan et al. (2018) find the effects to be negative. Using a cross-country sample from 10 countries, Hamza and Saadaoui (2018) document that Islamic banks debt financing is negatively affected by interest rates. This negative effect, however, decreases as the profit-sharing investment accounts increase. A summary of these findings with the sample countries and periods covered as well as type of financing used as the dependent variable is presented in Table 1.

However, their methodology calls for reconsideration. Almost all of these studies look at Islamic banks through the lenses of conventional banks and treat their financing instruments as if they were all the same – i.e. they mostly study the aggregate figures. Unlike conventional banks in which all lending instruments are debt-based and such aggregation is sensible, Islamic banks have diverse financing instruments in their portfolios – they may act as trustees in one, as lessors in another, as partners in the third, etc.

[4] One has to be aware, however, that the choice is rational only as far as real costs of interest-based debt financing are hidden. For example, no mention is made of the costs of the infrastructural legal and administrative edifice needed to enforce "impossible" debt contracts, the loss of government revenues that create an incentive for debt contracts which means loss of resources to the government to spend on development projects, as well as other costs, such as repeated crises.

[5] The first modern Islamic bank, *Mit-Ghamr* Islamic Saving Associations, was established in Egypt in 1963 (Ibrahim, 2016).

[6] Includes 77 banks from 13 countries. Please refer to Section 3 for details.

Table 1
Literature review summary.

Authors	Country	Period	Type of financing	Interest rate effect
Adebola et al. (2011)	Malaysia	2006–2011	Aggregate financing	Negative
Ibrahim and Sukmana (2011)	Malaysia	1998–2009	Aggregate financing	Negative
Ibrahim and Sufian (2014)	Malaysia	1999–2010	Aggregate financing	Negative
Ahmad and Abdul Majid (2017)	Malaysia	1995–2013	Gross/net loans	Negative
Zulkhibri (2018)	Malaysia	2006–2012	Gross/net loans	Negative
Kader and Leong (2009)	Malaysia	1999–2007	BBA property financing	Positive
Ibrahim (2016)	Malaysia	2001–2013	Gross & net loans/financing	Insignificant
Aysan et al. (2018)	Turkey	2004–2012	Gross/net loans	Negative
Ergeç and Arslan (2013)	Turkey	2005–2009	Aggregate financing	Positive
Hamza and Saadaoui (2018)	10 countries	2005–2014	Aggregate financing	Negative

These contracts are intrinsically different from one another. Therefore, treating them as one and regressing them to the mean does not provide a true picture and may conceal individual instruments' differences with regard to the interest rate.

This study constitutes a modest endeavor towards addressing this methodological shortcoming by disaggregating gross financing into three main types of instruments based on the nature of their underlying contracts - i.e. sale-based, lease-based and risk-sharing financing – with the main objective of determining the impact of interest rate on them. Second, given the justification that Islamic banks' imitation of conventional products and instruments was to some extent understandable in the early stages of their development, we want to investigate whether the interest rate impact on these instruments is any different in the jurisdictions where Islamic banking has reached the level of systemic importance versus those where it has not. Lastly, considering the frequent criticism that Islamic bank subsidiaries are a mere extension of their conventional parent companies disguised by Islamic names, we want to compare whether the effects of interest rate on these instruments are the same in full-fledged Islamic banks as opposed to Islamic bank subsidiaries of conventional banks.

Our study contributes to the literature in at least three ways. First, we build on the strand of research that investigates Islamic banks' exposure to interest rate risk. While there is a number of studies that investigate the impact of interest rates on gross or net financing (or assets), this study, to the best of our knowledge, is the first to disaggregate gross financing of Islamic banks into its three main components and examine the interest rate impact on them. These instruments are inherently different from each other. Hence, empirical verification of their relationship with the interest rate is much needed to dispel the notion that Islamic bank financing is all interest-based.

Second, we contribute to the literature on the convergence/divergence of Islamic banks with/from their conventional counterparts. Lack of experience, competitive pressure, market insignificance, unfavorable regulatory environments, and various other factors might have made it difficult for Islamic banks to stay out of the interest rate sphere of influence, especially at the early stages of their development. However, that is expected to change as the overall Islamic banking grows in size and importance. To verify whether that holds true, we investigate if the levels of Islamic banking development and market significance play any role in immunizing Islamic banks from interest rate risk. We do this by dividing banks into two groups based on the systemic importance of Islamic banking in jurisdictions in which they operate – that is systemically important and non-systemically important jurisdictions – and examine if the interest rate effects are the same on the two. If, for instance, interest rate does affect an instrument in countries where the market share of Islamic banking is small, but not in the countries where the market share is systemically significant, this would imply that Islamic banks need some time to free themselves from the interest rate chains and would provide a support to those who justify Islamic banks' mimicking of conventional bank products and instruments at their early stages of development. The opposite findings would imply an ongoing convergence process.

Lastly, most of the existing studies of the effect of interest rate on Islamic bank financing are on individual countries such as Malaysia, Indonesia, Turkey, or GCC countries. This study enriches the literature by undertaking a cross-country study of 13 countries, of which eight are home to systemically important Islamic banking.

The remainder of the paper is organized as follows. Section 2 outlines the methodology and econometric specifications. Section 3 presents the data and descriptive statistics, while section 4 provides the estimation results and discusses them. Finally, section 5 concludes with a summary of the main findings and policy implications.

2. Methodology

2.1. Disaggregation of Islamic bank financing instruments

In principle, Islamic bank financing instruments have to be attached to a real asset or real economic activity. Unlike conventional banking where debt contracts are central to the understanding of financial intermediation (Diamond, 1984), in Islamic banking, a transaction contract depends on the nature of the real activity or asset that is being financed. It is crucial to notice that Islamic transaction contracts and the financial instruments they facilitate are two different things. It is possible that the risk-sharing attributes of a financial instrument may be weaker than the Islamic transaction contract it aims to serve (Iqbal and Mirakhor, 2013, p. 33). In fact, Trakic (2019) claims that the classical Islamic commercial contracts have been creatively manipulated by Islamic banks in Malaysia to such an extent that some of them are fictitious and prone to various forms of substantive and procedural unfairness typical of conventional banking. While acknowledging the issue of discrepancy in this regard, we take Islamic banks' classification of instruments per contracts at face value – i.e. as reported in their audited financial statements.

To address the objectives of our study, we employ accounting data as reported in Islamic banks' audited financial statements. We disaggregate gross financing[7] of Islamic banks into three main types based on the nature of underlying contracts used for financing instruments. These three types are:

Sale-based financing instruments comprise the financing instruments which use the sale as the underlying contract between a bank (financier) and its client. This arrangement usually requires a bank to acquire an asset for a customer and then sell it to him/her on agreed terms and conditions.

Lease-based financing instruments include the financing arrangements or facilities that use *Ijarah* (lease) as the underlying contract between a bank (financier) and its client. This arrangement usually requires a bank to acquire an asset for a customer and then leases it to him/her on agreed terms and conditions. Other variations of lease-based contracts include leasing of an asset with an option to buy back the asset at the end of the leasing period.

Risk-sharing financing instruments comprise the financing instruments extended by Islamic banks to their customers based on the partnership contracts such as *Mudarabah* and *Musharakah*. These two are considered cornerstones of Islamic finance.

Commonly used sale-based, lease-based and risk-sharing contracts and their definition can be found in Table 2.

We present the share of individual financing instruments in gross financing per country and year in Table 3, and we plot the year averages in Fig. 1. The predominant financing instruments, in what are considered the most developed Islamic finance jurisdictions, are sale- and lease-based, and as of 2017 they stood at 93.5% and 5.6% in Saudi Arabia, 78.4% and 13.7% in Malaysia, 59.3% and 30.8% in Bahrain, 45% and 43.1% in UAE, respectively. Overall, risk-sharing financing comprised about 4.9% of the gross financing for the period 2003–2017. In 2017 alone, the share stood at 5.4%. Interestingly, however, the highest share of risk-sharing financing in gross financing, on average, for our sample period is found in banks from Pakistan (44.4%) and Indonesia (36.5%). These shares have been growing significantly since 2013 and have reached levels of 53.9% and 40.7% in 2017, respectively. Additionally, the ideal Islamic financing instruments (i.e. *Mudarabah* and *Musharakah*) comprised tiny 7.1% in Malaysia, 8.4% in Bahrain, 5.3% in UAE and 0.5% in Saudi Arabia in 2017. A detailed analysis of these financings shares per country and year can be found in Table 3. It is also interesting to note that there are banks in our sample which have risk-sharing deposits, but not risk-sharing financing and vice versa.

2.2. Model specification

To estimate the effects of interest rate on Islamic banks' financing instruments, we specify the baseline model as:

$$Financing_{bt} = \gamma Financing_{bt-1} + \beta Interest_t + \delta B_{bt-1} + \theta C_t + \tau_t + \nu_b + \varepsilon_{bt} \quad (1)$$

where $Financing_{bt}$ is the natural logarithm of one of the CPI-adjusted financing instruments of bank b at time t – namely, sale-based financing (SBF_{bt}), lease-based financing (LBF_{bt}), and risk-sharing financing (RSF_{bt}); $Interest_t$ is the interest rate of the country in which a bank resides in time t proxied by interbank offer rate; B_{bt-1} is a vector of bank-specific variables at time $t-1$; C_t is a vector of country-specific variables at time t; τ_t is a time-specific effect; ν_b is a bank-specific time-invariant effect and ε_{bt} is the common error term. We include the lagged dependent variable to capture potential dynamics in financing instruments due to potential targets set by banks such as financing growth, financing portfolio diversification, financing share in overall assets, etc.

We include the following bank-specific variables: bank size measured by the natural logarithm of real assets (*Size*); bank capitalization measured by equity to assets ratio (*Capital*), and deposits to liability ratio (*Deposits*). These variables are used in year *t-1* to mitigate the potential endogeneity problem. We recognize that various bank-specific variables have been used in the banking literature. However, we include only these three to lower the potential multicollinearity issue that may arise from adding too many bank-specific variables. Given the inherently different risk-return profiles of Islamic bank financing instruments, we consider these three bank-specific control variables to be most relevant for our investigation. Controlling for bank size is important as larger banks can afford to keep riskier loan (financing) portfolios due to the safety net subsidies that they enjoy (Kane, 2010). Small and big banks carry different business models, the former lending to small and opaque companies, while the latter dealing mainly with large and more transparent borrowers being able to enjoy the benefits of diversification and economies of scale (Abedifar et al., 2018). Including *Capital* is also important as a rise in it emboldens risk-taking behavior (Koehn and Santomero, 1980; Kim and Santomero, 1988) and is usually associated with reduced moral hazard problems as well as greater monitoring incentives (Keeley and Furlong, 1990; Berger et al., 1995). Given the high risk of risk-sharing financing instruments, it is important to see if and how changes in *Capital* affect this type of financing. Lastly, deposits are a crucial source of funding for Islamic banks as Islamic money and capital markets are not well developed and the access to alternative sources of funding is limited (Farooq and Zaheer, 2015), hence the importance of testing Islamic banks' dependence on this source of funding.[8] Lastly, we include the following country-specific variables to control for the overall macroeconomic conditions: natural logarithm of real GDP per capita and inflation rate.

In Eq. (1), the key variable is the interest rate ($Interest_t$). Its coefficient β represents the sensitivity of bank financing instruments to interest rate changes. If we find that $\beta > 0$ and is statistically significant, it would suggest that interest rate positively impacts financing instruments. If $\beta < 0$ and is statistically significant, then the impact is negative.

[7] Gross values of what is often reported in the financial statements as "Financing, advances and other financing".

[8] When estimating the effects of interest rates on risk-sharing financing instruments, *Deposits* are measured as natural logarithm of real risk-sharing deposits (also known as investment accounts). For the estimation of the other types of financing instruments, we use total deposits over total liabilities ratio. We do this for two reasons. First, we expect that Islamic banks are too cautious about their depositors and would not use the normal deposits to finance risk-sharing instruments. Second, we want to test the assertions by some practitioners that depositors are not keen on risk-sharing by examining the pass-through rate of risk-sharing deposits to risk-sharing financing.

Table 2
Classification and definition of contracts/instruments.

Contract	Meaning
Sale-based	
Bai' Al-Dayn	Sale of debt
Bai' Al-Inah	Buying an object for cash then selling it to the same party for a higher price whose payment is deferred so that the purchase and sale of the object serve as a ruse for lending on interest
Bai' Muajjal/Ajil/BBA	Credit sale or sale at deferred payment
Istisna'a	Manufacturing contract whereby a manufacturer agrees to produce (build) and deliver a well-described good (or premise) at a given price on a given date in the future
Musawama	Bargaining on price, haggling
Murabahah	Mark-up sale, sale at a margin
Salam/Salaf	Forward sale where the price of a specific good is paid in advance for its delivery at a specified time in the future
Tijarah/Mutajarah	Business, commerce, trade
Lease-based	
Ijarah	Leasing, rent
Ijarah Muntahia-Bi-Tamlīk	Hire purchase
Ijarah Thumma Al-Bay'	Hire purchase
Ijarah Wa-Iqtina'	Hire purchase
Risk-sharing	
Mudarabah	A partnership whereby one party (the capital owner) provides capital to an entrepreneur to undertake a business activity. Profits are shared between them as agreed, but any financial loss is borne only by the capital owner, as his loss is his unrewarded efforts put into the business activity.
Musharakah	Partnership whereby all the partners contribute capital for a business venture. The partners share profits on pre-agreed ratios while losses are shared according to each partner's capital contribution.

Note: The meaning of the contracts is taken from WB and IDBG (2016).

To address the second objective of our study, we investigate the effects of interest rate on Islamic bank financing instruments by dividing the sample into jurisdictions where Islamic banking is systemically important and otherwise. An Islamic financial market of a country is considered as being systemically important if its total banking assets comprise more than 15% of its total domestic banking sector assets (IFSB, 2018). The aim is to examine if Islamic banks grow out of the interest rate sphere of influence as they individually and the overall Islamic banking market of that particular jurisdiction grow in size and importance. To estimate this relationship, we modify Eq. (1) by introducing the interaction term between the interest rate and banks that come from jurisdictions in which Islamic banking is systemically important. Thus,

$$Financing_{bt} = \gamma Financing_{bt-1} + (\beta_1 + \beta_2 Systemic_t) \times Interest_t + \lambda\, Systemic_t + \delta B_{bt-1} + \theta C_t + \tau_t + \nu_b + \varepsilon_{bt} \quad (2)$$

where *Systemic* equals 1 if bank *b* is domiciled in a jurisdiction in which Islamic banking has reached the level of systemic importance and 0 otherwise. β_1 represents the adjustment of financing instruments to interest rate changes for banks from non-systemically important jurisdictions, while $\beta_1 + \beta_2$ represents the adjustment for banks from systemically important jurisdictions. If $\beta_1 > 0$ and is significant, it would imply that the effect of interest rate on financing instruments of banks from non-systemically important jurisdictions is positive. Similarly, if $\beta_1 + \beta_2$ is jointly significant and if $\beta_2 > 0$, it would suggest that the effect of interest rate on financing instruments of banks from systemically important jurisdictions is positive and larger than on financing instruments of banks from non-systemically important jurisdictions.

Lastly, to address the third objective of our study, we investigate the effects of interest rate on Islamic bank financing instruments by dividing the sample into full-fledged Islamic banks and Islamic bank subsidiaries of conventional banks. To estimate this, we specify the model as:

$$Financing_{bt} = \gamma Financing_{bt-1} + (\beta_1 + \beta_2 Subsidiary_{bt}) \times Interest_t + \lambda\, Subsidiary_{bt} + \delta B_{bt-1} + \theta C_t + \tau_t + \nu_b + \varepsilon_{bt} \quad (3)$$

where *Subsidiary* equals 1 if bank *b* is a subsidiary of a conventional bank and 0 if it is a full-fledged Islamic bank. β_1 represents the adjustment of financing instruments to interest rate changes for full-fledged Islamic banks, while $\beta_1 + \beta_2$ represent the adjustment for Islamic bank subsidiaries. If $\beta_1 > 0$ and is significant, it would imply that the effect of interest rate on financing instruments of full-fledged Islamic banks is positive. Similarly, if $\beta_1 + \beta_2$ is jointly significant and if $\beta_2 > 0$, it would suggest that the effect of interest rate on financing instruments of Islamic bank subsidiaries is positive and larger than on financing instruments of full-fledged Islamic banks.

Note that in all our equations we examine the relationship between *Interest* and *Financing* in year *t*.

2.3. Estimation method

Our specified models include a lagged dependent variable with the aim of capturing the possible dynamic relationship. Given the characteristics of our data, i.e. small number of time periods (T) and relatively large number of cross sections (N), the traditional panel estimators of our equations would be problematic. The reason is a non-zero correlation between the lagged predicted variable and individual-fixed effect, due to which the estimators would be exposed to the risk of seriously biased coefficients (Nickell, 1981) and would be particularly severe in the case of panel datasets with large (N) and small (T) (Mileva, 2007). Therefore, we employ the

Table 3
Average share of individual financing instruments in gross financing per country and year.

SBF/GrossFin	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
Bahrain	0.881	0.918	0.729	0.758	0.703	0.672	0.626	0.638	0.627	0.604	0.615	0.601	0.570	0.580	0.593	0.620
Bangladesh						0.619	0.686	0.711	0.726	0.734	0.861	0.754	0.748	0.710	0.715	0.733
Brunei Darussalam							0.880	0.861	0.821	0.768	0.758	0.866	0.665			0.794
Indonesia						0.580	0.576	0.610	0.657	0.675	0.664	0.618	0.598	0.551	0.552	0.616
Jordan						0.725	0.751	0.733	0.691	0.756	0.714	0.476	0.422	0.443	0.450	0.568
Kuwait		1.000	1.000	0.998	0.979	0.967	0.970	0.975	0.978	0.978	0.976	0.798	0.806	0.772	0.785	0.893
Malaysia	0.922	0.945	0.929	0.789	0.858	0.731	0.725	0.736	0.734	0.744	0.773	0.778	0.780	0.782	0.784	0.769
Oman											0.543	0.408	0.326			0.363
Pakistan						0.442	0.463	0.557	0.569	0.562	0.596	0.579	0.439	0.319	0.301	0.436
Qatar			0.885	0.812	0.720	0.698	0.757	0.812	0.857	0.842	0.814	0.807	0.813	0.781	0.778	0.800
Saudi Arabia			1.002	1.001	0.991	0.992	0.990	0.988	0.992	0.989	0.991	0.991	0.991	0.945	0.935	0.980
Turkey						0.000	0.000	0.000	0.000	0.000	0.000	0.935				0.872
UAE	0.660	0.611	0.572	0.657	0.634	0.509	0.512	0.484	0.511	0.495	0.527	0.544	0.542	0.473	0.450	0.509
Average	0.753	0.818	0.901	0.894	0.880	0.772	0.757	0.755	0.767	0.768	0.781	0.774	0.749	0.717	0.713	0.758
LBF/GrossFin	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
Bahrain	0.000	0.000	0.145	0.160	0.177	0.223	0.285	0.274	0.263	0.257	0.261	0.266	0.287	0.310	0.308	0.266
Bangladesh						0.359	0.294	0.262	0.259	0.236	0.095	0.104	0.101	0.230	0.238	0.199
Brunei Darussalam							0.120	0.138	0.178	0.226	0.234	0.089	0.314			0.194
Indonesia						0.000	0.000	0.001	0.002	0.003	0.001	0.012	0.009	0.007	0.014	0.006
Jordan						0.263	0.240	0.257	0.301	0.235	0.267	0.245	0.251	0.272	0.279	0.262
Kuwait		0.000	0.000	0.000	0.019	0.034	0.032	0.025	0.021	0.020	0.024	0.203	0.193	0.169	0.160	0.093
Malaysia	0.039	0.054	0.067	0.199	0.133	0.264	0.267	0.246	0.236	0.217	0.190	0.174	0.163	0.146	0.137	0.184
Oman											0.457	0.592	0.674			0.637
Pakistan						0.175	0.139	0.105	0.093	0.095	0.076	0.070	0.061	0.067	0.064	0.078
Qatar			0.084	0.152	0.184	0.189	0.174	0.142	0.132	0.153	0.179	0.162	0.162	0.180	0.183	0.168
Saudi Arabia			0.000	0.000	0.002	0.002	0.003	0.003	0.002	0.003	0.002	0.002	0.001	0.048	0.056	0.014
Turkey						1.000	1.000	1.000	1.000	1.000	1.000	0.064				0.127
UAE	0.181	0.239	0.180	0.195	0.176	0.318	0.349	0.413	0.407	0.435	0.412	0.406	0.398	0.409	0.431	0.392
Average	0.126	0.111	0.048	0.073	0.074	0.168	0.189	0.197	0.189	0.188	0.177	0.176	0.188	0.201	0.203	0.182
RSF/GrossFin	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Average
Bahrain	0.119	0.082	0.125	0.082	0.120	0.105	0.089	0.088	0.110	0.139	0.123	0.133	0.143	0.089	0.084	0.111
Bangladesh						0.022	0.021	0.027	0.016	0.030	0.043	0.142	0.150	0.008	0.007	0.051
Brunei Darussalam							0.001	0.001	0.001	0.006	0.008	0.018	0.021			0.009
Indonesia						0.420	0.424	0.389	0.341	0.322	0.333	0.333	0.376	0.423	0.407	0.365
Jordan						0.012	0.009	0.010	0.008	0.009	0.009	0.038	0.038	0.034	0.034	0.024
Kuwait		0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Malaysia	0.039	0.001	0.004	0.012	0.009	0.005	0.007	0.020	0.030	0.039	0.037	0.049	0.056	0.064	0.071	0.045
Oman											0.000	0.000	0.000			0.000
Pakistan						0.383	0.398	0.338	0.338	0.343	0.327	0.336	0.488	0.528	0.539	0.444
Qatar			0.031	0.036	0.095	0.113	0.069	0.046	0.011	0.004	0.007	0.024	0.025	0.023	0.027	0.027
Saudi Arabia			0.000	0.000	0.008	0.005	0.007	0.009	0.007	0.008	0.008	0.006	0.008	0.004	0.005	0.006
Turkey						0.000	0.000	0.000	0.000	0.000	0.000	0.000				0.000
UAE	0.159	0.150	0.248	0.148	0.190	0.174	0.138	0.103	0.082	0.071	0.060	0.049	0.057	0.057	0.053	0.079
Average	0.122	0.071	0.052	0.033	0.046	0.059	0.053	0.049	0.043	0.044	0.042	0.045	0.057	0.051	0.054	0.049

system generalized method of moments (GMM) estimator proposed by Arellano and Bover (1995), and Blundell and Bond (1998) due to its superiority in handling dynamic panel modeling.

The first-difference GMM estimator by Arellano and Bond (1991) applies first differencing to remove individual-specific effects and lagged-level variables as instruments to address the potential correlation between the explanatory variables and the error terms. While the difference GMM estimator justifies the validity of using the lagged levels of regressors as instruments, these instruments may be weak for differenced variables. If the explanatory variables are persistent over time, there is a tendency for the first differences of the GMM estimator to behave poorly and to lead to large sample bias (Blundell and Bond, 1998). Likewise, due to the absence of information about the parameters of interest in the levels of variables in the first difference, GMM estimates can result in a loss of substantial part of the total variation in the data (Arellano and Bover, 1995). To solve this issue, Arellano and Bover (1995) and Blundell and Bond (1998) suggest using the "System GMM" estimator, which combines in a system both the regression in first differences and the regression in levels. To compute the system GMM estimator, variables in levels are instrumented with the lags of their own differences, while variables in differences are instrumented with the lags of their own levels. In the system GMM, while the levels of the dependent variable may be correlated with the individual specific effects, the differences are not. Thus, we can use the lagged differences as instruments in the levels equation. This method allows the introduction of more instruments and thereby improves efficiency (Roodman, 2009). Because it has the capacity to improve efficiency and reduce the finite sample bias, Blundell and Bond (1998) consider the system GMM to perform better than the difference GMM. We choose the two-step system GMM estimators and use the Windmeijer (2005) finite-sample correction, which makes the two-step GMM estimates more efficient than the one-step estimates (Roodman, 2009). For comparison purposes, we also report the two-step difference GMM estimations.

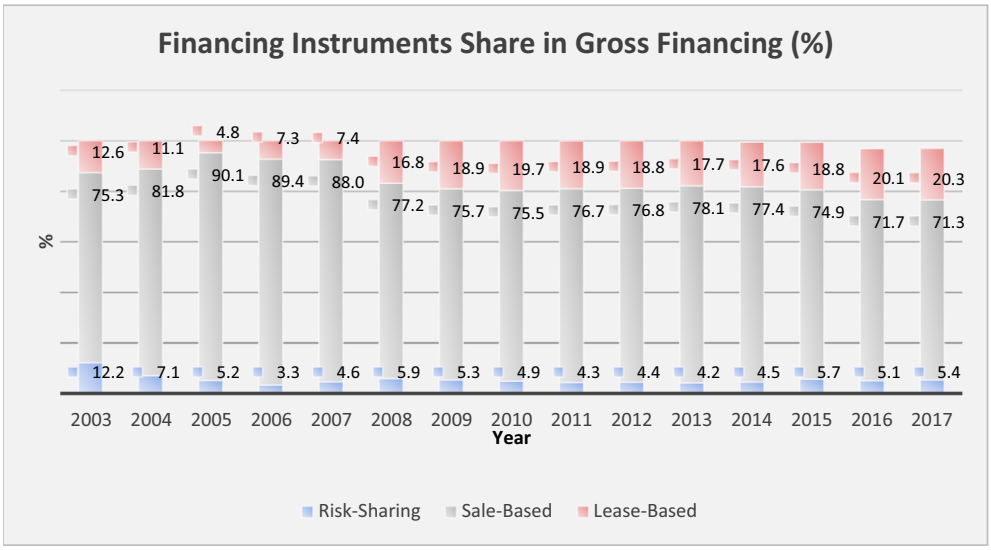

Fig. 1. Share of individual financing instruments in gross financing (%).

In order to ensure the GMM estimation validity, we run post-estimation specification tests. These include testing the assumptions that the instruments are valid (exogenous) and that the error terms do not exhibit serial correlation. To run these tests, we use STATA,[9] which offers two sets of specification tests as suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first set includes Sargan and Hansen tests of over-identification. The null hypothesis of these tests states that the instruments are valid. The second set of tests examines the hypothesis that the error term is not serially correlated. The Arellano and Bond tests AR (1) and AR(2) examine the absence of first and second order serial correlation in the differenced residuals. Failure to reject the null hypotheses of the over-identification and non-autocorrelation of order 2, i.e. AR(2), tests gives support to our model.

3. Data and descriptive statistics

Our sample is an unbalanced panel that includes annual data for 77 Islamic commercial banks from 13 countries[10] during the period 2003–2017. The main source of our bank-specific data is BankFocus (earlier known as BankScope). However, financing instruments per contracts and risk-sharing deposits were hand-collected from banks' audited annual reports. Interest rates are sourced from Thomson Reuters Eikon, while the other country-specific variables are sourced from the World Bank's World Development Indicators.

In determining which countries to include in our sample, we impose two conditions. First, we include all countries in which Islamic banking is systemically important[11] irrespective of the number of Islamic banks operating in that country.[12] Second, we include only those countries which have at least three active Islamic banks and whose market share is not less than 5% of the total banking assets of that country as of 2017.[13] We impose these conditions so that we have a sample of countries in which Islamic banking has reached at least some notable level of development and maturity. Furthermore, we include only Islamic commercial banks that have a consistent dataset of at least 3 years of continuous observations. Lastly, we eliminate outliers in all bank-specific variables by winsorizing at the 1st and 99th percentile at the country level.

Table 4 provides descriptive statistics for the overall sample and also for the sub-samples divided into banks from systemically important and non-systemically important jurisdictions, and also divided into full-fledged Islamic banks and Islamic bank subsidiaries. Interestingly, the proportion of sale-based financing in total assets is on average higher in banks from systemically important jurisdictions, while lease-based and risk-sharing financing shares are on average higher in banks from non-systemically important jurisdictions. Expectedly, banks from systemically important jurisdictions are, on average, larger in size and depend less on deposits as a source of funding than the banks from non-systemically important jurisdictions. This, perhaps, is due to more developed Islamic money and capital markets and the availability of alternative sources in these jurisdictions. Interestingly, they are also better

[9] We use the STATA 15.0 software and Roodman's (2009) *xtabond2* command due to its more flexible features over the built-in command. In order to avoid any hazard that may come with this command, we strictly follow Roodman's (2009) instructions on how to use it.

[10] Bahrain, Bangladesh, Brunei Darussalam, Indonesia, Jordan, Kuwait, Malaysia, Oman, Pakistan, Qatar, Saudi Arabia, Turkey, United Arab Emirates.

[11] As of 2Q2017, Islamic banks' market share in country's banking assets is 19.8% in Bangladesh, 61.8% in Brunei Darussalam, 15.5% in Jordan, 39.3% in Kuwait, 24.9% in Malaysia, 25.7% in Qatar, 51.5% in Saudi Arabia, and 19.9% in UAE (IFSB, 2018).

[12] For example, Brunei Darussalam has only one Islamic bank, but its market share is 61.8% of the total banking assets in Brunei.

[13] These include Bahrain with 14.1%, Indonesia 5.4%, Oman 11.5%, Pakistan 11.6%, and Turkey circa 5 + % of market share as of 2Q2017 (IFSB, 2018).

capitalized and the risk-sharing deposits' share in total liabilities is by far smaller than that of banks from non-systemically important jurisdictions. As for full-fledged Islamic banks and Islamic bank subsidiaries, sale-based financing share in total assets is relatively higher in the former, while lease-based and risk-sharing financings shares are higher in the latter. Full-fledged Islamic banks are also slightly larger in size, better capitalized and use more deposits as a source of their funding than Islamic bank subsidiaries.

4. Estimation results

In our estimations, all explanatory variables are treated as weakly exogenous. This is reasonable as we use lagged-one bank-specific variables and as it is not likely that bank-level financing shocks would have effects on GDP per capita and inflation (Ibrahim, 2016). Furthermore, all estimations include the year dummies and bank-specific fixed effects, except when their inclusion leads to a multi-collinearity problem or a higher number of instruments than the number of groups. This helps us control for potential time-related shocks and bank characteristics not captured in our specifications. However, for the sake of brevity and due to lack of informative content of these two variables, we do not report them in our tables. Moreover, since there is no clear guidance on how many instruments is too many, we restrict the instruments of the regressors in such a way that the number of instruments does not exceed the number of groups and at the same time produces the Hansen test *p*-value between the recommended bounds, i.e. 0.1 and 0.25 (Roodman, 2009). In addition, we report the superior Hansen over Sargan statistics given its robustness to heteroscedasticity in the two-step GMM framework.

4.1. Basic results

Table 5 presents the estimation results of Eqs. (1), (2) and (3) applying the two-step system and two-step difference GMM procedures. Our inference is based on the system GMM results for the reasons explained in the estimation method section. For the sake of comparison and robustness check, we also present the difference GMM results. The diagnostic statistics reported at the bottom of the table imply fitness of the GMM estimations. The residuals in models (1), (2) and (3) appear to be free of the autocorrelation problem as we fail to reject the null of no autocorrelation of order 2 (AR(2)). Lastly, the Hansen test statistics confirm the validity of instruments employed in our estimations.

Table 5 presents the estimation results for our three types of financing instruments, i.e. sale-based, lease-based and risk-sharing. Regressions (1) and (5) show that the interest rate has negative effects on sale-based and lease-based financing instruments, respectively while controlling for the bank-specific and country-specific variables. The results imply that a one percentage point increase in the interest rate reduces the real sale-based and real lease-based financing by roughly about 2 and 6.5 percentage points, respectively. The first-difference GMM estimators also confirm the results for sale-based financing, but not for lease-based. In regressions (2) and (6) we add the interactive dummy for Islamic banks from systemically important jurisdictions and find that the interest rate impact on sale-based financing is negative and statistically significant only in systemically important jurisdictions, while the negative impact on lease-based financing is significant in both types of jurisdictions. Interestingly, when we add the Islamic bank subsidiary interactive dummy in regressions (3) and (7), we find that the interest rate effects on sale- and lease-based financing instruments are significant only in the case of full-fledged Islamic banks.

As for risk-sharing financing, the results for the whole sample in regression (9) show that the interest rate has no effect on it. The first-difference GMM estimators yield the same results. However, the interactive dummy for Islamic banks from systemically important jurisdictions in regression (10) shows that the interest rate has a positive and statistically significant effect on risk-sharing financing of Islamic banks from non-systemically important jurisdictions at the 10% significance level. Furthermore, our interactive dummy for Islamic bank subsidiaries in regression (11) reveals that interest rate affects positively risk-sharing financing of full-fledged Islamic banks, but not Islamic banks subsidiaries.

Our unique framing of the data into segregated parts has produced interesting results. That financing under the two debt-based instruments is negatively affected by the interest rate is no surprise. Funding costs change due to interest rate changes and as a consequence banks have to reprice their financing instruments. By contrast, the risk-sharing financing instruments appear to be immune to interest rate risk. Such financing being real sector-based are impacted more by changes in underlying asset fundamentals than interest rate changes. These findings have profound implications for Islamic banking, especially on the way forward. First, the current reliance of Islamic banks on sale- and lease-based financing imply that they may have missed the *raison d'être* of their role within the Islamic finance ecosystem. Merely mimicking conventional products and replicating them offers little value-added even if it is *Shari'ah* compliant. The real value-added of Islamic finance lies in the risk-sharing instruments which offer risk profiles that are completely different from those of debt-based instruments. Being quasi equity-like, they can offer the best of both debt and equity. The safety of equity and the absence of leverage but with the terminality of debt. Being terminal and asset-based, the earnings dilution is specific to the asset financed and ends with the tenor of the risk-sharing contract. For a world that now has a huge debt overhang, these are important advantages. Second, Islamic banking's current path may ultimately result in convergence and irrelevance. The emphasis on debt-based instruments makes Islamic banks redundant as conventional banks are better positioned both from an economic and evolutionary viewpoint to offer such instruments. The reliance on fixed-debt contracts on the asset side but short-term financing on the liability side means that the duration gaps for Islamic banks are often much larger than that of their conventional peers. The implication being that Islamic banks have more interest rate risk than conventional banks. This is truly ironical since Islamic banks are supposed to be operating in an interest-free environment. Lastly, risk-sharing financing is the obvious way forward for Islamic banks. Such financing not only offers them a truly different niche but reduces their interest rate risk, avoids contagion and enhances both the banking sector and macro-economic stability. Much of these benefits come from the reduced moral hazard arising from the increased monitoring and scrutiny that risk-sharing instruments entail. More importantly for governments, increased use of risk-sharing instruments by banks reduces their contingent liability.

As for the control variables, bank size and GDP per capita are found to be significant in the case of sale-based and lease-based financing. Larger banks tend to do more of sale- and lease-based financing than the small banks due to possibly economies of scale

Table 4
Descriptive statistics.

Variables	Full sample			Non-systemicaly important			Systemically important			Full-fledged Islamic banks			Islamic bank subsidiaries		
	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Financing measures:															
Sale-based - SBF ($'000)	695	3,785,342	8,133,594	222	636,589	2,424,526	473	5,263,193	9,363,041	453	4,479,755	8,721,501	242	2,485,470	6,726,207
LnSBF	222	12.254	1.592	473	14.432	1.445	695	13.736	1.806	453	13.893	1.881	242	13.442	1.618
ΔLnSBF	618	0.013	0.046	196	0.017	0.073	422	0.010	0.025	403	0.011	0.040	215	0.016	0.055
SBF/Assets	695	0.419	0.183	222	0.340	0.172	473	0.456	0.176	453	0.415	0.185	242	0.426	0.179
SBF/GrossFinancing	695	0.696	0.214	222	0.620	0.215	473	0.732	0.204	453	0.711	0.219	242	0.668	0.201
Lease-based-LBF ($'000)	595	1,063,355	2,134,876	185	152,160	233,560	410	1,474,504	2,459,613	381	1,112,738	2,382,138	214	975,434	1,604,492
LnLBF	185	10.041	2.975	410	13.053	1.703	595	12.117	2.586	381	12.392	2.005	214	11.627	3.331
ΔLnLBF	516	0.021	0.108	156	0.041	0.172	360	0.013	0.061	332	0.017	0.086	184	0.029	0.140
LBF/Assets	595	0.130	0.114	185	0.068	0.092	410	0.158	0.112	381	0.125	0.112	214	0.139	0.117
LBF/GrossFinancing	595	0.260	0.237	185	0.282	0.340	410	0.250	0.171	381	0.258	0.236	214	0.263	0.238
Risk sharing-RSF ($ '000)	433	396,507	761,161	192	256,489	387,241	241	508,056	946,224	294	379,686	803,467	139	432,084	664,188
LnRSF	192	11.249	1.783	241	11.346	2.283	433	11.303	2.074	294	11.207	2.112	139	11.507	1.985
ΔLnRSF	382	0.024	0.158	171	0.018	0.161	211	0.029	0.155	262	0.023	0.184	120	0.025	0.072
RSF/Assets	434	0.112	0.139	192	0.185	0.162	242	0.054	0.079	295	0.091	0.123	139	0.155	0.159
RSF/GrossFinancing	433	0.180	0.201	192	0.305	0.217	241	0.080	0.113	294	0.160	0.187	139	0.222	0.223
Bank-specific variables:															
Dep.-liabilities ratio	491	0.783	0.191	169	0.739	0.265	322	0.807	0.133	293	0.796	0.196	198	0.765	0.183
RS Dep.-liabilities ratio	462	0.504	0.307	157	0.601	0.279	305	0.454	0.309	276	0.542	0.318	186	0.448	0.281
Total assets (Log)	723	14.753	1.572	250	13.719	1.490	473	15.299	1.321	473	14.933	1.591	250	14.410	1.480
Equity-assets ratio	716	0.151	0.141	250	0.203	0.198	466	0.124	0.087	473	0.168	0.153	243	0.118	0.108
Country-specific variables:															
Interbank offer rate	724	3.807	3.152	250	5.324	3.851	474	3.007	2.349	474	3.809	3.583	250	3.804	2.111
GDP per capital (Log)	723	9.223	1.240	250	8.846	1.092	473	9.422	1.268	473	9.339	1.414	250	9.004	0.769
Inflation	715	4.060	3.401	250	5.316	3.883	465	3.384	2.899	469	4.225	3.842	246	3.743	2.316

Table 5
System GMM estimation results – baseline results: risk-sharing, sale-based and lease-based financing.

Variables	Financing = Sale-Based				Financing = Lease-Based				Financing = Risk-Sharing			
	System GMM			Diff GMM	System GMM			Diff GMM	System GMM			Diff GMM
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$Financing_{t-1}$	0.695***	0.706***	0.662***	0.306	0.779***	0.800***	0.815***	0.337	0.787***	0.742***	0.773***	0.378***
	[0.151]	[0.155]	[0.158]	[0.338]	[0.119]	[0.129]	[0.108]	[0.288]	[0.235]	[0.284]	[0.237]	[0.110]
$lnterest_t$	−0.019**	−0.009	−0.020***	−0.034***	−0.065**	−0.267***	−0.122***	−0.123	0.103	0.108*	0.140**	0.104
	[0.008]	[0.018]	[0.008]	[0.012]	[0.030]	[0.093]	[0.041]	[0.079]	[0.070]	[0.060]	[0.066]	[0.069]
Systemic		0.119				−0.325				0.153		
		[0.085]				[0.423]				[0.646]		
$Interest_t \times$ Systemic		−0.006				0.114*				−0.040		
		[0.019]				[0.068]				[0.072]		
Subsidiary			−0.072				0.049				0.512	
			[0.105]				[0.357]				[0.792]	
$Interest_t \times$ Subsidiary			0.029				−0.044				−0.138	
			[0.034]				[0.104]				[0.199]	
$Deposits_{t-1}$	0.079	0.066	0.069	0.079	−0.109	0.314	0.031	−0.040	0.310	1.186	−0.210	−20.129*
	[0.083]	[0.111]	[0.084]	[0.102]	[0.343]	[0.452]	[0.289]	[0.444]	[4.073]	[4.096]	[3.437]	[10.551]
$Size_{t-1}$	0.334**	0.303*	0.379**	0.391	0.354*	0.226	0.265	0.196	0.066	0.100	−0.064	1.480
	[0.162]	[0.160]	[0.177]	[0.286]	[0.200]	[0.153]	[0.162]	[0.384]	[0.185]	[0.264]	[0.204]	[1.717]
$Capital_{t-1}$	0.372	0.440	0.431	0.651	1.776	0.002	1.520	−4.942*	1.216	1.484	0.613	3.825
	[0.350]	[0.405]	[0.330]	[0.683]	[1.154]	[1.690]	[1.012]	[2.666]	[1.902]	[2.108]	[1.852]	[3.740]
$GDPperCapita_t$	−0.042*	−0.030	−0.047*	−0.246**	−0.118	0.022	−0.175*	0.797	−0.131	−0.184	0.004	−0.857
	[0.025]	[0.033]	[0.024]	[0.118]	[0.082]	[0.147]	[0.102]	[0.691]	[0.223]	[0.199]	[0.203]	[0.858]
$Inflation_t$	0.002	−0.000	0.002	0.011	0.016	0.202**	0.045	0.206**	−0.109*	−0.105**	−0.124*	−0.125***
	[0.009]	[0.012]	[0.008]	[0.013]	[0.023]	[0.091]	[0.028]	[0.098]	[0.056]	[0.044]	[0.062]	[0.046]
Constant	0.000	−0.172	−0.515		0.000	−1.057	0.135		0.000	2.573	3.200	
	[.]	[0.414]	[0.497]		[.]	[1.617]	[0.778]		[.]	[3.456]	[3.388]	
Systemic: $\beta_1 + \beta_2 = 0$		−0.015**				−0.153**				0.068		
		[0.007]				[0.075]				[0.107]		
Subsidiary: $\beta_1 + \beta_2 = 0$			0.009				−0.166				0.001	
			[0.035]				[0.116]				[0.165]	
Observations	392	392	392	322	341	341	341	275	236	236	236	176
No. of instruments	57	51	59	47	65	59	59	31	41	43	43	32
No. of groups	70	70	70	65	66	66	66	58	48	48	48	44
AR(1) (p-value)	0.056	0.055	0.057	0.193	0.047	0.034	0.049	0.278	0.188	0.314	0.200	0.662
AR(2) (p-value)	0.186	0.270	0.162	0.071	0.784	0.804	0.702	0.993	0.195	0.208	0.191	0.249
Hansen (p-value)	0.400	0.227	0.314	0.358	0.489	0.279	0.324	0.236	0.238	0.101	0.111	0.345

Note: (i) Standard errors in brackets, (ii) * $p < .1$, ** $p < .05$, *** $p < .01$, (iii) Year dummy and bank-specific time-invariant terms included, but not reported for the sake of brevity.

Table 6
System GMM estimation results – financing growth/first difference operator.

Variables	ΔFinancing = Sale-Based			ΔFinancing = Lease-Based			ΔFinancing = Risk-Sharing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$\Delta Financing_{t-1}$	−0.131	−0.144	−0.151	−0.104	−0.089	−0.126	0.011	0.009	0.011
	[0.136]	[0.140]	[0.144]	[0.116]	[0.111]	[0.123]	[0.055]	[0.055]	[0.058]
$lnterest_t$	−0.002***	−0.001	−0.002***	−0.056*	−0.064**	−0.073**	0.012*	0.013*	0.013*
	[0.001]	[0.001]	[0.001]	[0.032]	[0.030]	[0.033]	[0.006]	[0.006]	[0.007]
Systemic		0.009			−0.132**			0.039	
		[0.007]			[0.063]			[0.024]	
$Interest_t \times$ Systemic		−0.002			0.021**			−0.003	
		[0.001]			[0.011]			[0.004]	
Subsidiary			0.008			−0.015			0.023
			[0.010]			[0.066]			[0.027]
$Interest_t \times$ Subsidiary			−0.003			0.009			−0.006
			[0.003]			[0.017]			[0.006]
$Deposits_{t-1}$	0.002	−0.004	−0.001	0.075	0.141**	0.099	−0.015	−0.032	0.001
	[0.006]	[0.007]	[0.007]	[0.067]	[0.056]	[0.066]	[0.165]	[0.159]	[0.168]
$Size_{t-1}$	0.001	0.001	0.001	−0.019	−0.017	−0.020	−0.006*	−0.014**	−0.007
	[0.002]	[0.002]	[0.002]	[0.016]	[0.018]	[0.015]	[0.004]	[0.006]	[0.005]
$Capital_{t-1}$	0.049	0.054	0.055	−0.169	−0.256	−0.170	−0.185	−0.193	−0.187
	[0.055]	[0.056]	[0.059]	[0.222]	[0.244]	[0.208]	[0.175]	[0.140]	[0.191]
$GDPperCapita_t$	−0.005*	−0.005*	−0.004	−0.016	0.007	−0.027	0.015	0.015	0.016
	[0.003]	[0.003]	[0.003]	[0.028]	[0.031]	[0.030]	[0.010]	[0.010]	[0.011]
$Inflation_t$	0.000	−0.000	0.000	0.057*	0.054**	0.070**	−0.010**	−0.009**	−0.009**
	[0.001]	[0.001]	[0.001]	[0.031]	[0.027]	[0.034]	[0.004]	[0.004]	[0.004]
Constant	0.040**	0.000	0.036	0.000	0.000	0.672*	−0.057	0.033	0.000
	[0.018]	[.]	[0.025]	[.]	[.]	[0.363]	[0.124]	[0.139]	[.]
Systemic: $\beta_1 + \beta_2 = 0$		−0.002***			−0.043*			0.009	
		[0.001]			[0.025]			[0.006]	
Subsidiary: $\beta_1 + \beta_2 = 0$			−0.004			−0.064*			0.007
			[0.003]			[0.036]			[0.007]
Observations	355	355	355	298	298	298	209	209	209
No. of instruments	49	43	43	41	43	43	40	42	42
No. of groups	70	70	70	63	63	63	47	47	47
AR(1) (p-value)	0.134	0.146	0.148	0.068	0.076	0.059	0.220	0.209	0.220
AR(2) (*p*-value)	0.998	0.896	0.888	0.380	0.370	0.356	0.278	0.282	0.278
Hansen (p-value)	0.810	0.400	0.250	0.532	0.298	0.508	0.660	0.515	0.532

Note: (i) Standard errors in brackets, (ii) * p < .1, ** p < .05, *** p < .01, (iii) Year dummy and bank-specific time-invariant terms included, but not reported for the sake of brevity.

and a stronger relationship with firms. In line with Ibrahim (2016), GDP per capita carries a negative coefficient. This implies that these two types of financing instruments possess countercyclical features, which provide further support to the stabilizing merit of Islamic banking. In line with Ibrahim (2016), the capitalization coefficient is indistinguishable from zero. The funding ratio or deposits-liabilities ratio is also statistically insignificant. This is quite surprising especially in the case of risk-sharing deposits and risk-sharing financing as one would expect them to be closely related. Lastly, inflation is found to have a significant negative effect on risk-sharing financing and confirms a similar finding by Seho et al. (2016) and Abdul Karim et al. (2014).

4.2. Robustness checks

To add credence to our results, we conduct several robustness checks. First, we employ the first difference in place of the natural logarithm of real financing to check for potential interest rate impact on the growth of our three types of financing instruments. The results presented in Table 6 further substantiate the impact of interest rate on our three groups of financing instruments. By and large, the results remain the same in terms of the relationship and statistical significance. Few interesting differences, however, are observed. One, the magnitudes of the coefficients are smaller, which is expected given that we employ the first difference operator. Two, smaller banks tend to have higher growth of risk-sharing financing than large banks. At the same time, bank size is not statistically significant in the case of sale- and lease-based financing unlike in our primary results. Three, the smoothing role of Islamic banks over the business cycle appears to stem from sale-based financing, but not the other two financing types.

Our second robustness check employs gross financing[14] to total assets ratio to capture potential financing and asset portfolio reallocation due to interest rate changes. For the most part, the results presented in Table 7 confirm our primary findings. There are three differences in terms of the interest rate impact. One, the impact on sale-based financing is negative in both types of jurisdictions

[14] We use gross values of individual instruments. We acknowledge that it might be better to use net values to assets ratio, but disaggregated data at the financing instrument level is not available.

Table 7
System GMM estimation results – financing to assets ratio.

Variables	Financing = Sale-Based			Financing = Lease-Based			Financing = Risk-Sharing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financing $_{t-1}$	0.785***	0.795***	0.766***	0.954***	1.007***	0.983***	0.926***	0.910***	0.926***
	[0.048]	[0.052]	[0.049]	[0.040]	[0.044]	[0.046]	[0.147]	[0.089]	[0.089]
lnterest$_t$	−0.007***	−0.006*	−0.007***	−0.003*	−0.008	−0.007***	0.008**	0.007*	0.007**
	[0.002]	[0.003]	[0.002]	[0.002]	[0.007]	[0.003]	[0.003]	[0.004]	[0.003]
Systemic		0.029			−0.039			0.009	
		[0.020]			[0.047]			[0.046]	
Interest$_t$ × Systemic		−0.000			−0.003			0.000	
		[0.003]			[0.008]			[0.004]	
Subsidiary			−0.013			−0.121*			−0.010
			[0.020]			[0.067]			[0.027]
Interest$_t$ × Subsidiary			0.008			0.038*			0.002
			[0.006]			[0.020]			[0.008]
Deposits$_{t-1}$	0.028	0.022	0.027	−0.004	0.007	−0.014	−0.023	−0.029	−0.032
	[0.022]	[0.025]	[0.021]	[0.009]	[0.021]	[0.020]	[0.017]	[0.034]	[0.046]
Size$_{t-1}$	0.009	0.004	0.013*	0.003*	0.010***	0.008	−0.008	−0.017	−0.014
	[0.006]	[0.006]	[0.007]	[0.002]	[0.003]	[0.006]	[0.010]	[0.024]	[0.011]
Capital$_{t-1}$	0.035	0.054	0.060	0.100	0.078	0.113	−0.077	−0.179	−0.171**
	[0.062]	[0.066]	[0.061]	[0.092]	[0.079]	[0.124]	[0.101]	[0.122]	[0.083]
GDPperCapita$_t$	−0.016**	−0.014*	−0.017**	−0.003	−0.018**	−0.012*	0.006	0.011	0.010
	[0.007]	[0.008]	[0.007]	[0.003]	[0.008]	[0.007]	[0.008]	[0.014]	[0.007]
Inflation$_t$	0.002	0.002	0.002	0.001	0.001	−0.000	−0.006**	−0.003	−0.003
	[0.002]	[0.002]	[0.002]	[0.001]	[0.004]	[0.002]	[0.002]	[0.002]	[0.002]
Constant	0.000	0.113	0.048	0.000	0.062	0.031	0.000	0.000	0.000
	[.]	[0.074]	[0.088]	[.]	[0.076]	[0.070]	[.]	[.]	[.]
Systemic: $\beta_1 + \beta_2 = 0$		−0.006**			−0.012***			0.007**	
		[0.003]			[0.004]			[0.003]	
Subsidiary: $\beta_1 + \beta_2 = 0$			0.000			0.030			0.008
			[0.005]			[0.020]			[0.008]
Observations	392	392	392	341	341	341	236	236	236
No. of instruments	33	35	35	57	57	57	29	43	43
No. of groups	70	70	70	66	66	66	48	48	48
AR(1) (p-value)	0.111	0.102	0.130	0.011	0.015	0.015	0.021	0.025	0.027
AR(2) (p-value)	0.140	0.138	0.136	0.804	0.858	0.654	0.182	0.201	0.199
Hansen (p-value)	0.463	0.314	0.371	0.366	0.124	0.133	0.151	0.160	0.178

Note: (i) Standard errors in brackets, (ii) * p < .1, ** p < .05, *** p < .01, (iii) Year dummy and bank-specific time-invariant terms included, but not reported for the sake of brevity.

unlike in the primary analysis where the impact was negative and significant only in the case of systemically important jurisdictions. Two, the impact on lease-based financing is not significant in the case of non-systemically important jurisdictions unlike in the primary results. Three, the impact on risk-sharing financing is positive and statistically significant in both types of jurisdictions unlike in the primary results. In addition, the signs and significance of our control variables remain, by and large, the same.

Our last robustness check employs policy rate in place of the interbank offer rate used in the primary tests. We notice that there is not as much variation in the policy rate as in interbank offer rate. Nonetheless, the results presented in Table 8 provide some valuable insights. The effects on overall sale- and lease-based financing remain negative as in the primary results. Again, the introduction of our two interactive dummy variables reveals that the policy rate impact on sale-based financing is significant only in the case of systemically important jurisdictions. The impact on lease-based financing is significant in all estimations. As for risk-sharing financing, the policy rate has no impact on it under any of our three model specifications. The control variables, for the most part, maintain the same relationship and significance – that is, size has a positive impact on sale- and lease-based financing; GDP per capita has a negative impact on sale- and lease-based financing; inflation has a positive impact on lease-based and negative impact on risk-sharing financing, and capitalization and deposits are not significant. We can conclude that, by and large, our robustness checks strongly confirm the primary results.

4.3. Further investigation

This section complements our study by examining the effects of interest rate on gross financing in place of individual financing instruments. Table 9 presents the estimation of Eqs. (1), (2) and (3) by using gross financing in place of individual financing instruments. We estimate the results by using both the baseline and the robustness check variables. The results are overall similar to those found under sale- and lease-based financing.[15]

[15] We do observe abnormally high coefficients when we use logged values of real financing instruments. However, the other two measures, i.e. the first difference and gross financing to assets ratio, are very similar to those of sale- and lease-based financing coefficients.

Table 8
System GMM estimation results – policy rate.

Variables	Financing = Sale-Based			Financing = Lease-Based			Financing = Risk-Sharing		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Financing $_{t-1}$	0.686***	0.586***	0.559**	0.813***	0.768***	0.796***	0.714***	0.708***	0.712***
	[0.176]	[0.221]	[0.261]	[0.162]	[0.125]	[0.126]	[0.173]	[0.165]	[0.169]
lnterest$_t$	−0.085*	−0.040	−0.076	−0.157***	−0.150***	−0.117***	0.060	0.063	0.105
	[0.051]	[0.056]	[0.080]	[0.055]	[0.053]	[0.041]	[0.077]	[0.081]	[0.080]
Systemic		0.820			−0.038			−0.166	
		[0.711]			[0.425]			[0.754]	
Interest$_t$ × Systemic		−0.091			0.052			0.035	
		[0.087]			[0.060]			[0.103]	
Subsidiary			0.473			0.488			0.724
			[0.857]			[0.566]			[0.760]
Interest$_t$ × Subsidiary			0.014			−0.176			−0.150
			[0.145]			[0.169]			[0.138]
Deposits$_{t-1}$	0.001	0.001	−0.000	0.044	−0.035	0.233	0.756	0.837	1.254
	[0.003]	[0.001]	[0.001]	[0.300]	[0.332]	[0.283]	[3.103]	[2.786]	[3.416]
Size$_{t-1}$	0.350	0.390*	0.445*	0.282	0.329*	0.294*	0.056	0.056	0.023
	[0.220]	[0.230]	[0.232]	[0.265]	[0.173]	[0.179]	[0.123]	[0.175]	[0.121]
Capital$_{t-1}$	2.047	2.106**	1.953	1.754	0.841	0.912	−0.499	−0.927	−0.333
	[1.253]	[1.026]	[1.687]	[1.243]	[1.761]	[1.343]	[2.328]	[2.207]	[2.420]
GDPperCapita$_t$	−0.517*	−0.430*	−0.546*	−0.185*	−0.119	−0.093	−0.111	−0.051	−0.073
	[0.272]	[0.239]	[0.317]	[0.096]	[0.131]	[0.102]	[0.179]	[0.188]	[0.181]
Inflation$_t$	−0.001	0.001	0.004	0.058***	0.057***	0.067**	−0.084*	−0.083*	−0.098**
	[0.017]	[0.018]	[0.014]	[0.022]	[0.019]	[0.029]	[0.043]	[0.046]	[0.048]
Constant	3.926	0.000	4.324	0.219	−0.546	0.000	0.000	0.000	3.234
	[2.849]	[.]	[3.708]	[1.709]	[1.618]	[.]	[.]	[.]	[1.957]
Systemic: $\beta_1 + \beta_2 = 0$		−0.131*			−0.098*			0.097	
		[0.074]			[0.057]			[0.091]	
Subsidiary: $\beta_1 + \beta_2 = 0$			−0.062			−0.293*			−0.045
			[0.090]			[0.170]			[0.127]
Observations	392	392	392	341	342	341	236	236	236
No. of instruments	45	51	54	65	66	59	41	43	43
No. of groups	70	70	70	66	67	66	48	48	48
AR(1) (p-value)	0.049	0.059	0.057	0.046	0.038	0.034	0.149	0.138	0.143
AR(2) (p-value)	0.272	0.205	0.129	0.731	0.772	0.700	0.203	0.203	0.196
Hansen (p-value)	0.184	0.183	0.154	0.357	0.305	0.346	0.288	0.115	0.144

Note: (i) Standard errors in brackets, (ii) * p < .1, ** p < .05, *** p < .01, (iii) Year dummy and bank-specific time-invariant terms included, but not reported for the sake of brevity.

An interesting implication may be derived from these results. Using aggregate or gross financing, which is the case with most of the previous studies, conceals individual financing instrument differences and skews the results towards the results of dominant financing instruments. In our case, as pointed out earlier, the dominant instruments are sale- and lease-based instruments and the interest rate effect on gross financing is in line with the effects on these two dominant financing instruments. On the other hand, the impact on risk-sharing instruments would be concealed have they not been taken out of gross financing. This is exactly what justifies our study and where our main contribution to the literature stems from.

5. Conclusion

This paper investigated the impact of interest rates on three Islamic bank financing instruments grouped by the nature of their underlying contracts – i.e. sale-based, lease-based, and risk-sharing. Employing dynamic panel estimations on a unique panel data set of 77 banks from 13 countries over the period 2003–2017, we find that these three types of Islamic bank financing instruments are far from being immune to interest rate risk. This is ironical, since Islamic Financing is supposed to be detached from interest rates given the *Shari'ah* prohibition on the use/charging of interest. Our results show interest rates to have negative effects on sale- and lease-based financing instruments but have no effect on risk-sharing financing instruments. However, when we distinguish between the banks from systemically important and non-systemically important jurisdictions, the evidence appears to confine the negative interest rate effect on sale-based instruments only to the former, whereas the negative effects on lease-based instruments hold in both jurisdictions. With regards to risk-sharing financing instruments, the results imply that they are positively affected by the interest rate in non-systemically important jurisdictions, but not in systemically important jurisdictions. Furthermore, when we distinguish between full-fledged Islamic banks and Islamic bank subsidiaries, the effects on sale-based and risk-sharing instruments seem to be insignificant in the case of the latter, while the effects remain the same as in the overall sample under all other model specifications.

These findings, by and large, remain consistent under several robustness checks including two alternative measures of financing instruments and one alternative measure of interest rate proxied by the policy rates. We also show the importance of examining

Table 9
System GMM estimation results – gross financing.

Variables	GrossFinancing (Log) - Interbank			ΔGrossFinancing - Interbank			GrossFinancing/Assets - Interbank			GrossFinancing (Log) - PolicyRate		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
$GrossFinancing_{t-1}$	0.662***	0.667***	0.704***	−0.953***	−0.955***	−0.968***	0.716***	0.736***	0.800***	0.757***	0.735***	0.769***
	[0.141]	[0.108]	[0.114]	[0.245]	[0.233]	[0.262]	[0.102]	[0.113]	[0.111]	[0.123]	[0.104]	[0.115]
$Interest_t$	−0.212***	−0.228**	−0.234***	−0.006*	−0.001	−0.004	−0.010***	−0.010*	−0.021***	−0.112**	−0.091*	−0.069*
	[0.075]	[0.093]	[0.089]	[0.003]	[0.005]	[0.006]	[0.004]	[0.005]	[0.008]	[0.053]	[0.050]	[0.041]
Systemic	21.2	−0.068			0.036			0.024			0.287	
		[0.255]			[0.035]			[0.034]			[0.273]	
$Interest_t \times$ Systemic		0.030			−0.009*			0.001			−0.027	
		[0.055]			[0.006]			[0.004]			[0.047]	
Subsidiary			−0.143			0.030			−0.002			0.237
			[0.252]			[0.095]			[0.023]			[0.229]
$Interest_t \times$ Subsidiary			0.026			−0.004			0.001			−0.083
			[0.068]			[0.025]			[0.006]			[0.077]
$Deposits_{t-1}$	−0.002		−0.002	−0.061	−0.074	−0.068	−0.024	−0.022	−0.018	−0.217	−0.287	−0.225
	[0.003]	[0.003]	[0.003]	[0.042]	[0.046]	[0.054]	[0.028]	[0.026]	[0.025]	[0.309]	[0.340]	[0.368]
$Size_{t-1}$	0.369**	0.349**	0.323**	0.028	0.025	0.029	0.009	0.004	0.006	0.256	0.263**	0.225
	[0.180]	[0.137]	[0.132]	[0.020]	[0.017]	[0.021]	[0.008]	[0.011]	[0.009]	[0.161]	[0.130]	[0.147]
$Capital_{t-1}$	−0.317	−0.377	−0.381	0.450	0.414*	0.485*	0.063	0.070	0.091	−0.366	−0.312	−0.481
	[0.965]	[1.134]	[1.275]	[0.278]	[0.242]	[0.276]	[0.093]	[0.103]	[0.094]	[0.769]	[0.872]	[0.912]
$GDPperCapita_t$	−0.372***	−0.328***	−0.369***	−0.035**	−0.043*	−0.034*	−0.032***	−0.027**	−0.040**	−0.215**	−0.214**	−0.141*
	[0.143]	[0.124]	[0.124]	[0.017]	[0.023]	[0.018]	[0.012]	[0.012]	[0.016]	[0.105]	[0.108]	[0.085]
$Inflation_t$	0.075*	0.086*	0.085*	0.001	−0.001	0.001	−0.002	−0.000	0.005	0.018	0.019	0.013
	[0.039]	[0.048]	[0.045]	[0.002]	[0.002]	[0.002]	[0.004]	[0.004]	[0.004]	[0.031]	[0.028]	[0.031]
Constant	3.880***	0.000	4.231***	0.000	0.034	−0.117	0.000	0.000	0.422***	0.000	0.000	0.000
	[1.153]	[.]	[1.492]	[.]	[0.102]	[0.207]	[.]	[.]	[0.133]	[.]	[.]	[.]
Systemic: $\beta_1 + \beta_2 = 0$		−0.198***			−0.011*			−0.009**			−0.119*	
		[0.074]			[0.006]			[0.003]			[0.062]	
Subsidiary: $\beta_1 + \beta_2 = 0$			−0.208**			−0.008			−0.020***			−0.151*
			[0.099]			[0.020]			[0.007]			[0.086]
Observations	416	416	416	376	376	376	416	417	416	417	416	416
No. of instruments	65	66	66	54	56	55	57	58	59	71	74	74
No. of groups	74	74	74	74	74	74	74	75	74	75	74	74
AR(1) (p-value)	0.013	0.009	0.008	0.231	0.222	0.260	0.019	0.018	0.010	0.029	0.027	0.031
AR(2) (p-value)	0.498	0.574	0.578	0.982	0.966	0.944	0.432	0.429	0.453	0.698	0.655	0.706
Hansen (p-value)	0.111	0.105	0.147	0.458	0.534	0.275	0.238	0.174	0.190	0.160	0.113	0.145

Note: (i) Standard errors in brackets, (ii) * p < .1, ** p < .05, *** p < .01, (iii) Year dummy and bank-specific time-invariant terms included, but not reported for the sake of brevity.

financing instruments separately by testing the interest rate effects on gross financing. The results, by and large, resemble those of the dominant instruments – i.e. sale- and lease-based instruments. These findings imply that using aggregate or gross financing can conceal individual financing instrument differences and skew the results in favor of the dominant financing instrument(s). Since risk-sharing financing constitutes a very small portion, aggregated analysis would have missed the true effect of interest rate on it.

A key implication of our results is that if Islamic bank financing continues to be dominated by the sale- and lease-based contracts, they run the risk of undermining the interest-free and risk-sharing essence of Islamic banking (Seho, 2018). This runs the risk of Islamic banks converging with their conventional counterparts and rendering themselves irrelevant. To some extent, this may already be happening as the share of these two instruments and their exposure to interest rate risk are amplified in the more developed Islamic banking markets. Our results also imply that the obvious route by which Islamic banks can minimize the impact of interest rates is through increased use of risk-sharing contracts. However, even in the better developed Islamic markets, risk-sharing based financing is still marginal.

Our findings also point to the fact that if Islamic banks had remained true to the *Shari'ah* required path of financing mostly on risk-sharing basis, they would be less susceptible to interest rate risk and thereby more resilient as a system. The current configuration of Islamic banking may be understandable to some extent, considering the current contracting environments which favor debt-based over risk-sharing instruments (Chapra and Khan, 2000). Regulators need to recognize this and create at least a level playing field if not a more favorable environment for risk-sharing financing in order for Islamic banks to be able to foster their axiomatic competencies. In view of our findings, regulators may want to consider revising the high-risk weight currently assigned for risk-sharing financing and removing the tax benefits of debt financing. Otherwise, it will be difficult for Islamic banks to put into operation the essence of Islamic finance.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Competing Interest

None.

References

Abdul Karim, M., Hassan, M.K., Hassan, T., Mohamad, S., 2014. Capital adequacy and lending and deposit behaviors of conventional and Islamic banks. Pac. Basin Financ. J. 28, 58–75. https://doi.org/10.1016/j.pacfin.2013.11.002.
Abedifar, P., Molyneux, P., Tarazi, A., 2018. Non-interest income and bank lending. J. Bank. Financ. 87, 411–426. https://doi.org/10.1016/j.jbankfin.2017.11.003.
Adebola, S.S., Yusoff, W.S.W., Dahalan, J., 2011. The impact of macroeconomic variables on islamic banks financing in Malaysia. Res. J. Fin. Account. 2 (4), 22–32.
Aggarwal, R.K., Yousef, T., 2000. Islamic banks and investment financing. J. Money Credit Bank. 32 (1), 93–120. https://doi.org/10.2307/2601094.
Ahmad, Z., Abdul Majid, N., 2017. Islamic bank financing, financial crisis and monetary policy: an interaction in the long run equilibrium. Int. J. Islam. Bank. 2 (1), 15–23.
Alaabed, A., Masih, M., 2016. Finance-growth nexus: insights from an application of threshold regression model to Malaysia's dual financial system. Borsa Istanbul Rev. 2 (2), 63–71.
Alaabed, A., Masih, M., Mirakhor, A., 2015. Undermining shared prosperity? Risk shifting and Islamic banking. In: Paper presented at the The World Bank and Islamic Development Bank Inaugural Annual Symposium on Islamic Finance 2015, Istanbul, Turkey, . https://ikr.inceif.org/handle/INCEIF/1653.
Ali, A.Y., 2006. The Meaning of the Holy Qur'an: Text, Translation and Commentary (in Modern English). Islamic Book Trust, Kuala Lumpur.
Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev. Econ. Stud. 58 (2), 277–297. https://doi.org/10.2307/2297968.
Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error-components models. J. Econ. 68 (1), 29–51. https://doi.org/10.1016/0304-4076(94)01642-D.
Ariff, M., 1988. Islamic banking. Asian-Pacific Econ. Lit. 2 (2), 48–64. https://doi.org/10.1111/j.1467-8411.1988.tb00200.x.
Askari, H., 2012. Islamic finance, risk-sharing, and international financial stability. Yale J. Int. Aff. 7 (1), 1–8.
Aysan, A.F., Disli, M., Ozturk, H., 2018. Bank lending channel in a dual banking system: why are Islamic banks so responsive? World Econ. 41 (3), 674–698. https://doi.org/10.1111/twec.12507.
Azmat, S., Skully, M., Brown, K., 2015. Can Islamic banking ever become Islamic? Pac. Basin Financ. J. 34, 253–272. https://doi.org/10.1016/j.pacfin.2015.03.001.
Bacha, O.I., 2019. Serious Gaps in Islamic Banking and Finance. Retrieved 3 April 2019, from Retrieved from. https://themalaysianreserve.com/2019/02/18/serious-gaps-in-islamic-banking-and-finance/ on April 3rd 2019. https://themalaysianreserve.com/2019/02/18/serious-gaps-in-islamic-banking-and-finance/.
Beck, T., Demirgüç-Kunt, A., Merrouche, O., 2013. Islamic vs. conventional banking: business model, efficiency and stability. J. Bank. Financ. 37 (2), 433–447. https://doi.org/10.1016/j.jbankfin.2012.09.016.
Berger, A.N., Herring, R.J., Szegö, G.P., 1995. The role of capital in financial institutions. J. Bank. Financ. 19 (3), 393–430. https://doi.org/10.1016/0378-4266(95)00002-X.
Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. J. Econ. 87 (1), 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8.
Chapra, M.U., Khan, T., 2000. Regulation and Supervision of Islamic Banks. IRTI, Jedah.
Chong, B.S., Liu, M.-H., 2009. Islamic banking: interest-free or interest-based? Pac. Basin Financ. J. 17 (1), 125–144. https://doi.org/10.1016/j.pacfin.2007.12.003.
Diamond, D.W., 1984. Financial intermediation and delegated monitoring. Rev. Econ. Stud. 51 (3), 393–414. https://doi.org/10.2307/2297430.
Ergeç, E.H., Arslan, B.G., 2013. Impact of interest rates on Islamic and conventional banks: the case of Turkey. Appl. Econ. 45 (17), 2381–2388. https://doi.org/10.1080/00036846.2012.665598.
Farooq, M., Zaheer, S., 2015. Are Islamic banks more resilient during financial panics? Pac. Econ. Rev. 20 (1), 101–124. https://doi.org/10.1111/1468-0106.12096.
Gale, D., Hellwig, M., 1985. Incentive-compatible debt contracts: the one-period problem. Rev. Econ. Stud. 52 (4), 647–663. https://doi.org/10.2307/2297737.
Hamza, H., Saadaoui, Z., 2018. Monetary transmission through the debt financing channel of Islamic banks: does PSIA play a role? Res. Int. Bus. Financ. 45, 557–570. https://doi.org/10.1016/j.ribaf.2017.09.004.
Ibrahim, M.H., 2016. Business cycle and bank lending procyclicality in a dual banking system. Econ. Model. 55, 127–134. https://doi.org/10.1016/j.econmod.2016.01.013.
Ibrahim, M.H., Sufian, F., 2014. A structural VAR analysis of Islamic financing in Malaysia. Stud. Econ. Financ. 31 (4), 371–386. https://doi.org/10.1108/SEF-05-2012-0060.
Ibrahim, M.H., Sukmana, R., 2011. Dynamics of Islamic financing in Malaysia: causality and innovation accounting. J. Asia Pac. Bus. 12 (1), 4–19. https://doi.org/10.1080/10599231.2011.539446.

IFSB, 2018. Islamic Financial Services Industry Stability Report 2018. Kuala Lumpur, Islamic Financial Services Board (IFSB).
Iqbal, Z., Mirakhor, A. (Eds.), 2013. Economic Development and Islamic Finance. International Bank for Reconstruction and Development/The World Bank, Washington, D.C..
ISRA, I., & Durham University, 2012. The Kuala Lumpur declaration. In: Paper Presented at the 2nd ISRA-IRTI-Durham University Strategic Roundtable Discussion (SRD2012), Kuala Lumpur, Retrieved from. https://ifikr.isra.my/library/pub/4227.
Kader, R.A., Leong, Y.K., 2009. The impact of interest rate changes on Islamic bank financing. Int. Rev. Bus. Res. Papers 5 (3), 189–201.
Kane, E.J., 2010. Redefining and containing systemic risk. Atl. Econ. J. 38 (3), 251–264. https://doi.org/10.1007/s11293-010-9233-3.
Keeley, M.C., Furlong, F.T., 1990. A reexamination of mean-variance analysis of bank capital regulation. J. Bank. Financ. 14 (1), 69–84. https://doi.org/10.1016/0378-4266(90)90036-2.
Khan, F., 2010. How 'Islamic' is Islamic banking? J. Econ. Behav. Organ. 76 (3), 805–820. https://doi.org/10.1016/j.jebo.2010.09.015.
Kim, D., Santomero, A.M., 1988. Risk in banking and capital regulation. J. Financ. 43 (5), 1219–1233. https://doi.org/10.2307/2328216.
Koehn, M., Santomero, A.M., 1980. Regulation of bank capital and portfolio risk. J. Financ. 35 (5), 1235–1244. https://doi.org/10.2307/2327096.
Mejelle, 2007. The Mejelle English Translation of Majallah el-Ahkam-I-Adilya and a Complete Code on Islamic Civil Law (CR Tyser, DG Demetriades, & H. Effendi, Trans.). The Other Press, Kuala Lumpur, Malaysia.
Mileva, E., 2007. Using Arellano-Bond Dynamic Panel GMM Estimators in Stata. *Tutorial with Examples Using Stata 9.0, Fordham University*.
Mirakhor, A., 1987. Analysis of short-term asset concentration in Islamic banking. In: *IMF Working Paper, (WP/87/67)*, 1–28, Available at SSRN. https://ssrn.com/abstract=884920.
Mirakhor, A., 2010. Whither Islamic finance? Risk sharing in an age of crises. In: Paper Presented at the Inaugural Securities Commission Malaysia (SC) – Oxford Centre for Islamic Studies (OCIS) Roundtable "Developing a Scientific Methodology on Shariah Governance for Positioning Islamic Finance Globally", Kuala Lumpur, Malaysia.
Mirakhor, A., Smolo, E., 2012. Discovering the roots of conventional and Islamic finance. In: Dar, H. (Ed.), Global Islamic Finance Report (GIFR) 2012. Edbiz Consulting Limited, London, pp. 148–153.
Mirakhor, A., Smolo, E., 2014. Epistemological foundation of finance: Islamic and conventional. Islam. Bank. Fin. Rev. *1* (1), 01–22. https://doi.org/10.32350/ibfr.2014.01.01.
Nickell, S., 1981. Biases in dynamic models with fixed effects. Econometrica 49 (6), 1417–1426. https://doi.org/10.2307/1911408.
Roodman, D., 2009. How to do xtabond2: an introduction to difference and system GMM in Stata. Stata J. 9 (1), 86–136.
Seho, M., 2018. *The Effects of Loan and Financing Portfolio Diversification on Bank Returns and Risk in Dual-Banking Systems.* (PhD Thesis). INCEIF, Kuala Lumpur Retrieved from INCEIF Knowledge Repository. https://ikr.inceif.org/handle/INCEIF/3029.
Seho, M., Alaabed, A., Masih, A.M.M., 2016. Risk-sharing financing of Islamic banks: better shielded against interest rate risk? J. Muamalat Islam. Fin. Res. 13 (2), 53–70.
Townsend, R.M., 1979. Optimal contracts and competitive markets with costly state verification. J. Econ. Theory 21 (2), 265–293. https://doi.org/10.1016/0022-0531(79)90031-0.
Trakic, A., 2019. Unfairness in Islamic finance contracts: the Malaysian case. J. Bank. Fin. Law Pract. 29 (4).
Ueda, M., 2004. Banks versus venture capital: project evaluation, screening, and expropriation. J. Financ. 59 (2), 601–621. https://doi.org/10.1111/j.1540-6261.2004.00643.x.
WB & IDBG, 2016. Global Report on Islamic Finance: Islamic Finance: A Catalyst for Shared Prosperity. World Bank & Islamic Development Bank Group, Washington, DC.
Windmeijer, F., 2005. A finite sample correction for the variance of linear efficient two-step GMM estimators. J. Econ. 126 (1), 25–51. https://doi.org/10.1016/j.jeconom.2004.02.005.
Zulkhibri, M., 2018. The impact of monetary policy on Islamic bank financing: bank-level evidence from Malaysia. J. Econ. Fin. Adm. Sci. 23 (46), 306–322. https://doi.org/10.1108/JEFAS-01-2018-0011.